PETROGRAPHY.

Marble. — Vogt[1] has given an abstract of the geology of marble deposits, together with an account of the structure and mechanical properties of the rock. He defines marbles as metamorphosed limestones in which complete crystallization has occurred, and divides them into regionally metamorphosed marbles and those produced by contact action. The latter are characterized by the presence of garnets, vesuvianite, scapolite, wollastonite, etc., and the former by the presence more particularly of quartz, grammatite, actinolite, and other hornblendes. Nearly all the marbles of commerce are dynamically metamorphosed rocks. The difference in microscopic structure between the two classes of marbles is illustrated by several figures representing thin sections, and the difference between calcite and dolomite marbles is illustrated by several other figures. Grains of dolomite are shown to interlock by much less complicated contours than those of calcite. The reasons for their variations in structure are discussed at some little length. The article is a thorough one in every respect and is well worth study.

Grits Metamorphosed into Crystalline Schists. — Callaway[2] describes the transformation of a series of grits and shales into what he regards as true crystalline schists. The phenomena were observed near Amlwch, North Anglesey. Grits, which in their original form are clearly clastic, have been changed by dynamic agencies into chlorite schists. The quartz grains of the original rocks have been changed into areas of interlocking grains, and the matrix in which they were imbedded has been altered to a felt of chlorite, of mica, or a mixture of the two. In extreme cases the quartzes have been squeezed out into lenticules and bands of quartz mosaic, and between these have developed bands of chlorite and muscovite.

Dioritic Rocks of the Pusterthal. — Spechtenhauser[3] and Cathrein[4] give us very thorough accounts of the dioritic dikes and stocks at St. Lorenzen in the Pusterthal. The former describes the dike forms as diorite-porphyrites and norite-porphyrites. The diorite-porphyrites include quartz-mica-porphyrites, quartz-hornblende-por-

[1] *Zeits. f. prakt. Geol.* (1898), pp. 4 and 43.
[2] *Quart. Journ. Geol. Soc.*, vol. liv (1898), p. 374.
[3] *Zeits. d. deutsch. geol. Ges.*, vol. l (1898), p. 1.
[4] *Ibid.*, p. 257.

phyrites, and augite-diorite-porphyrites (kersantites). The norite-porphyrites are all quartzose. Besides these he gives a few notes on some granular stock-rocks that are intermediate in composition between quartz-diorites and quartz-norites.

Cathrein points out the fact that the porphyrites have a granular groundmass and in other respects are closely allied to granular diorites. Among these he mentions the existence of töllites, vintlites, and suldenites. The töllites differ from the tonalite-porphyrites in being more basic and in containing a very little quartz but a large quantity of garnet. The vintlites contain dihexhedra of quartz as phenocrysts in a fine-grained green matrix. The type is not that described by Rosenbusch in his "Physiographie." The author would include all the rocks above described and those of Klausen under the name "Klausenite." They vary in composition between biotite-hornblende-diorites and corresponding rocks in which orthorhombic and monoclinic pyroxenes and often some quartz occur. The variation in their structure appears to be due to their varying composition rather than to their mode of occurrence. From the fact that diorites, norites, and gabbros are often found to intergrade, he regards them as constituting a great family. The Klausenites are the quartziferous forms of these. The author concludes his discussion with an argument against the use of different names to designate the dike and effusive forms of the porphyrites. He would class them together as diorite, norite, and gabbro-porphyrites.

Three California Rocks. — A peculiar dike rock cutting the granodiorite on the ridge between Butte and Plumas Counties, California, consists of quartz, plagioclase, and needles of an amphibole in a granitic aggregate. The amphibole is in largest quantity. Turner[1] reports its composition as follows:

SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	NiO	CaO	BaO	MgO	K_2O	Na_2O	H_2O<110°	H_2O>110°	Total
54.64	.61	12.09	1.81	5.03	.13	.05	7.74	.05	11.86	1.01	2.35	.12	2.44	= 100.01

A new amphibole-pyroxene rock is also described by the same author from Mariposa County, California, and a quartz-alunite rock from Indian Gulch in the same county. The former is made up of augite and amphibole grains, a little quartz, and some pyrrhotite, forming a matrix through which are scattered large phenocrysts of brown amphibole. The quartz-alunite rock is a metamorphosed clastic. An analysis of the alunite separated from it gave:

SiO_2	TiO_2	Al_2O_3	Fe_2O_3	CaO	K_2O	Na_2O	H_2O at 100°+	SO_3	Total
2.64	.40	38.05	.23	.55	4.48	2.78	11.92	38.50	= 99.55

[1] *Amer. Journ. Sci.*, vol. v (1898), p. 421.